

Claims

1. Method for providing or sharing or jointly using a mobile radio access network by several mobile radio providers, characterized in that a single radio access network (9; 12), operating for example according to the UMTS, CDMA 2,000, or GSM standard, is jointly used by several mobile radio providers.
2. Method according to claim 1, characterized in that network elements of a core network (6, 7; 10, 11) (Core Network, for example MSC and/or GSN) required for providing the mobile radio services are separately provided by each of the mobile radio providers.
3. Method according to one of the claims 1-2, characterized in that network elements of the core network (6, 7; 10, 11) (CN) are commonly used, for example, for providing voice connections (MSC), whereas other network elements for providing IP connections (packet network, GSN) are each provided by the different operators.
4. Method according to one of the claims 1-3, characterized in that for differentiating between the core networks (6, 7; 10, 11) of the different mobile radio providers, the respective identity of the network operator (PLMN identity) is provided in the radio access network (RAN or BSS) to the mobile radio subscriber (UE or MS) by transmission of more than one mobile radio operator identity (PLMN identity).
5. Method according to one of the claims 1-4, characterized in that more than one mobile radio operator identity (PLMN identity) is transmitted on an organization channel (for example the broadcast control channel - BCCH).
6. Method according to one of the claims 1-5, characterized in that more than one PLMN identity is transmitted, for example, in the Master Information Block (MIB) on the BCCH of a mobile radio system operating according to the UMTS standard, or in System Information Type 3 (SI3) in a mobile radio system operating according to the GSM

standard.

7. Method according to one of the claims 1-6, characterized in that more than one PLMN identity is transmitted in the Master Information Block (MIB) and the System Information Block 1 (SIB1) on the BCCH of a mobile radio system operating according to the UMTS standard.

8. Method according to one of the claims 1-7, characterized in that more than one PLMN identity is transmitted in the System Information Block 1 (SIB1) on the BCCH of a mobile radio system operating according to the UMTS standard.

9. Method according to one of the claims 1-8, characterized in that more than one PLMN identity is transmitted in a different System Information Block other than the Master Information Block (MIB) and the System Information Block 1 (SIB1) on the BCCH of a mobile radio system operating according to the UMTS standard.

10. Method according to one of the claims 1-9, characterized in that more than one PLMN identity is transmitted in a different block other than the System Information Type 3 (SI3) on the BCCH of a mobile radio system operating according to the GSM standard.

11. Method according to one of the claims 1-10, characterized in that when a connection is requested, the subscriber/the subscriber terminal (13) notifies the radio access network (9; 12) of the different core networks (6, 7; 10, 11) or PLMNs with which the connection is to be set up.

12. Method according to one of the claims 1-11, characterized in that when a connection is requested, the subscriber/the subscriber terminal (13) notifies the radio access network (9; 12) of the different core networks (6, 7; 10, 11) with which the connection is to be set up, and that this notification occurs with the transmission of the PLMN ID in the RRC CONNECTION REQUEST or the INITIAL DIRECT TRANSFER message in a mobile radio system operating according to the UMTS standard.

13. Method according to one of the claims 1-12, characterized in that when a connection is requested, the subscriber/the subscriber terminal (13) notifies the radio access network (9; 12) of the different core networks (6, 7; 10, 11) with which the connection is to be set up, and that this notification occurs with the transmission of the PLMN ID in the RRC CONNECTION REQUEST or the INITIAL DIRECT TRANSFER message in a mobile radio system operating according to the UMTS standard, wherein the PLMN identity is provided as MCC+MNC.

14. Method according to one of the claims 1-13, characterized in that when a connection is requested, the subscriber/the subscriber terminal (13) notifies the radio access network (9; 12) of the different core networks (6, 7; 10, 11) with which the connection is to be set up, and that this notification occurs with the transmission of the network operator ID (for example PLMN ID) in the RRC CONNECTION REQUEST or the INITIAL DIRECT TRANSFER message in a mobile radio system operating according to the UMTS standard, wherein only the MCC of the PLMN identity is transmitted.

15. Method according to one of the claims 1-14, characterized in that when a connection is requested, the subscriber/the subscriber terminal (13) notifies the radio access network (9; 12) of the different core networks (6, 7; 10, 11) with which the connection is to be set up, and that this notification occurs with the transmission of the network operator ID (for example PLMN ID) in the RRC CONNECTION REQUEST or the INITIAL DIRECT TRANSFER message in a mobile radio system operating according to the UMTS standard, wherein the PLMN identity is represented by an integer (1, 2, 3 ... n) or a bit string (e.g., "001"), and the actual PLMN identity is determined from the sequential order of transmission of the different PLMN identities on the BCCH.

16. Method according to one of the claims 1-15, characterized in that when a connection is requested, the subscriber/the subscriber terminal (13) notifies the radio access network (9; 12) of the different core networks (6, 7; 10, 11) with which the connection is to be set up, and that this notification occurs with the transmission of the network operator ID (for

example PLMN ID) neither in the RRC CONNECTION REQUEST nor the INITIAL DIRECT TRANSFER message in a mobile radio system operating according to the UMTS standard.

17. Method according to one of the claims 1-16, characterized in that more than one PLMN ID is transmitted in the System Information Block 1 (SIB1) on the BCCH of a mobile radio system operating according to the UMTS standard or core network information of more than one core network is transmitted within an SIB1.

18. Method according to one of the claims 1-17, characterized in that a signal represented, for example, by a single bit is transmitted on the organization channel (BCCH) of the radio access network (9; 12) to indicate if the radio network resources administration unit (RCN and/or BSC) provides the connection request of the subscriber/the subscriber terminal (13) with one of the core networks (6, 7; 10, 11) based on the IMSI of the subscriber terminal ("default" selection based on the subscriber IMSI).

19. Method according to one of the claims 1-18, characterized in that a signal represented, for example, by a single bit is transmitted on the organization channel (BCCH) of the radio access network (9; 12) to indicate if the radio network resources administration unit (RCN and/or BSC) provides the connection request of the subscriber/the subscriber terminal (13) with one of the core networks (6, 7; 10, 11) based on the IMSI of the subscriber terminal ("default" selection based on the subscriber IMSI), and the "default" signaling is selected based on the IMSI, or the mobile radio network operator ID (e.g., PLMN ID) is transmitted according to one of the previous methods by signaling (for example, one bit) on the organization channel (BCCH).

20. Method according to one of the claims 1-19, characterized in that more than one mobile radio network operator ID (PLMN ID) is transmitted to a subscriber terminal (13) in a mobile radio network operating according to the UMTS or GSM standard.

21. Method according to one of the claims 1-20, characterized in that additional mobile

network operator IDs (e.g., PLMN IDs) and hence of network operators, which the subscriber terminal (13) is potentially permitted to use, a transmitted through dedicated signaling between radio access network (9; 12) or core network (6, 7; 10, 11) and the subscriber terminal (13).

22. Method according to one of the claims 1-21, characterized in that additional PLMN IDs are always transmitted when a subscriber terminal (13) logs on to a mobile radio network for the purpose of registration, actually uses a service (for example, in the context of a "PDP context activation"), or indicates its actual location to the mobile radio network (e.g., for moving subscriber terminals, for example, through location registration procedures).

23. Method according to one of the claims 1-22, characterized in that additional possible mobile radio network operator IDs are transmitted according to a dedicated network-subscriber terminal relationship or based on a transmission on the organization channel BCCH, and that this information is used by the subscriber terminal (13) in such a way that radio access resources of another mobile radio operator can be used in the same way as if they were part of the registered mobile radio network.

24. Method according to one of the claims 1-23, characterized in that additional possible mobile radio network operator IDs are transmitted according to a dedicated network-subscriber terminal relationship, and that following a connection request, a subscriber terminal (13) transmits the network operator ID (PLMN ID) to the radio access network control unit (RNC/BSC) by using one of the method according to claims 1-23, and that the radio access network control unit (RNC/BSC) provides the corresponding connections to the requested core networks (6, 7; 10, 11) of the mobile radio network operator.

25. System for operating several mobile radio networks, characterized in that the mobile radio networks comprise a common radio access network (9; 12), but separate core networks (6, 7; 10, 11).

26. System according to claim 25, characterized in that at least one of the mobile radio networks comprises a core network element (MSC or GSN) for CS and PS connections and a radio network control unit (RNC or BSC), wherein one radio network control unit (RNC or BSC) is connected with more than one respective core network element (MSC or GSN) for CS and PS connections.

27. System according to claim 25 or 26, characterized in that one radio access network (RAN) is connected with more than one SGSN (for the PS domain).

28. System according to claim 25 or 26, characterized in that one radio access network (RAN) is connected with more than one MSC (for the CS domain).

29. Method for selecting core network elements of mobile radio networks according to claim 25, characterized in that the selection of the PLMN or of these core network elements (MSC or GSN) is based on signaling the selection by the subscriber terminal (13), in particular based on the signaled PLMN ID.